



River Protection Project  
Waste Treatment Plant  
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CCN: 013778

JUN 01 2000

Dear Dr. Gibbs:

**CONTRACT NO. DE-AC27-96RL13308 – W375 – AUTHORIZATION BASIS  
AMENDMENT REQUEST PACKAGE FOR THE RADIATION PROTECTION  
PROGRAM FOR DESIGN AND CONSTRUCTION**

Reference: CCN 013709, Letter, A. J. Dobson, BNFL Inc., to D.C. Gibbs, DOE/RL, "Contract No. DE-AC27-96RL13308-W375-Transmittal of the Radiation Protection Program for Design and Construction, Standard 4, c.2," dated May 31, 2000.

A disk in Microsoft Word format containing this letter and the attachments is included for the Regulatory Unit's use (Attachment 1).

The Authorization Basis Amendment Request (ABAR) package for BNFL-TWP-SER-003, *RPP for Design and Construction*, Revision 4, is attached. As described in the associated Safety Evaluation, BNFL Inc. has concluded that the changes to the Radiation Protection Program (RPP) do not decrease the effectiveness of the RPP, and the RPP, as changed, continues to meet the requirements of Code of Federal Regulations (CFR) 10 CFR 835. In compliance with 10 CFR 835.101(g)(2), U.S. Department of Energy approval of Revision 4 of the RPP is required because of the addition of construction phase scope.

Yours sincerely,

A. J. Dobson  
Manager, Operations and Safety

DJP/djp

- Attachments: (1) Disk with Letter and Attachments  
(2) SCA-W375-00-00071  
(3) ABCN-W375-00-00034  
(4) SE-W375-00-00027  
(5) ABAR-W375-00-00022

cc:

Barr, R. w/a disk	DOE/RL	A4-70
Barrett, M.K. w/o	DOE/ORP	H6-60
Brown, N. w/a	DOE/ORP	H6-60
Dobson, A.J. w/o	BNFL Inc.	A117
Klein, D. w/a	BNFL Inc.	ETC-1/P129
Landry, W. w/o	BNFL Inc.	Fairfax
Molnar, E. w/o	BNI	A216
Morgan, S.R. w/o	BNFL Inc.	A116
PDC w/a	BNFL Inc.	K110
Pisarcik, D. J. w/a	BNFL Inc.	B261
Smyser, L. w/a	PNNL	H6-61
Strawbridge, P. w/a	BNFL Inc.	A110
Tooze, R. w/o	BNFL Inc.	Fairfax
Williams, N. w/a	BNI	A215



# Screening Assessment

ISSUED BY  
RPP-WTP\_PDC  
CAG 5/21/00  
INIT J DATE

Screening Assessment No<sup>1</sup>: SCA-W375-00-00071 Initiating Change No: BNFL-TWP-SER-003 Rev: 3

Document Title: Radiation Protection Program for Design and Construction

Originator: D. J. Pisarcik Date: 5/24/00

**Description of Proposed Change and Relationship to the Authorization Basis:**  
The Radiation Protection Program is an Authorization Basis document that is being revised to address construction of the Waste Treatment Plant.

Answers to the following questions identify if the Authorization Basis is affected by the initiating change.

- |   | YES                                 | NO                                  |
|---|-------------------------------------|-------------------------------------|
| 1. Does this change conflict with requirements described in the SRD, or modify or delete a standard prescribed in the SRD?  | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| JUSTIFICATION:  |                                     |                                     |
| The revised RPP was reviewed against Chapter 5 SRD requirements and no conflicts were identified. In addition, this revision does not modify or delete any SRD requirement. Issuance of the Radiological Control Program (implementing document for RPP Rev 4) supports compliance with SC 5.0-1. |                                     |                                     |
| 2. Does this change conflict with language in the ISMP describing policies, plans, organizations, or procedures?  | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| JUSTIFICATION:  |                                     |                                     |
| The revised RPP was reviewed against Sections 2.3 and 3.9 of the ISMP and no conflicts were identified.   |                                     |                                     |
| 3. Does this change conflict with requirements described in the QAPIP? (If yes, perform change per K70CS28, Code of Practice for Managing Changes to the Authorization Basis, Appendix 4)   | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| JUSTIFICATION:  |                                     |                                     |
| The revised RPP was reviewed against Sections 2, 4, and 5 of the QAPIP and no conflicts were identified.  |                                     |                                     |
| 4. Does this change conflict with requirements described in the RPP? (If yes, perform change per K70CS28, Code of Practice for Managing Changes to the Authorization Basis, Appendix 5)   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| JUSTIFICATION:  |                                     |                                     |
| This change is a revision to the RPP to address WTP construction activities.  |                                     |                                     |
| 5. Does this change conflict with the requirements described in the ECP?  | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| JUSTIFICATION:  |                                     |                                     |
| The revised RPP was reviewed against ECP requirements and no conflicts were identified.   |                                     |                                     |
| 6. Does this change conflict with or alter any fundamental design aspects described in the ISAR? (See K70CS28, Code of Practice for Managing Changes to the Authorization Basis, Appendix 8)  | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| JUSTIFICATION:  |                                     |                                     |
| The revised RPP was reviewed against ISAR fundamental aspects of design (see K70CS28D_1, Appendix 8) and no conflicts were identified.  |                                     |                                     |

<sup>1</sup> The screening assessment number shall be obtained from Project Document Control.



# Screening Assessment

Screening Assessment No: SCA-W375-00-00071 Initiating Change No: BNFL-TWP-SER-003 Rev: 3

Document Title: Radiation Protection Program for Design and Construction

Originator: D. J. Pisarcik Date: 5/24/00

Answers to the following questions identify if the Authorization Basis is affected by the initiating change.

	YES	NO
7. Does this change conflict with or alter any significant or bounding hazard evaluations described in the HAR? (See K70C528, Code of Practice for Managing Changes to the Authorization Basis, Appendix 9)	<input type="checkbox"/>	<input checked="" type="checkbox"/>

JUSTIFICATION:

The revised RPP does not affect any hazard evaluations described in the HAR.

8. Does this change conflict with any Regulatory Commitment in the Action Tracking Database?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
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JUSTIFICATION:

The revised RPP does not alter any RPP-WTP Project commitments.

Conclusion:

- All answers to the above questions are No. The change does not affect the Authorization Basis, and can be implemented without an ABCN or written safety evaluation. This screening form must be completed and attached to the applicable change control or document control vehicle for the initiating change under consideration.
- At least one of the above answers is Yes. Therefore, an ABCN is to be performed, and a written safety evaluation is required (using the Safety Evaluation Worksheet), except for 3 and 4 as noted. This screening form must be completed and attached to the applicable change control or document control vehicle for the initiating change under consideration.

Originator: D. J. Pisarcik Date: 5-24-00 Reviewer<sup>2</sup>: Carl D. [Signature] Date: 5-30-00  
 Signature Signature

<sup>2</sup> The reviewer shall be a person from the same department as the originator, and at least as qualified as the originator to conduct a screening assessment.



## Authorization Basis Change Notice

ISSUED BY  
RPP-WTP POC  
Date 5/31/00  
INIT DATE

Page 1 of 1

Proposed Change Title: Radiation Protection Program for Design and Construction  
Proposed ABCN Number<sup>1</sup>: ABCN-W375-00-00034 Revision: 0  
Originator: D. J. Pisarcik Date: 5/24/00  
(Print Name)  
Radiological, Nuclear, and  
Process Safety Manager: *Dennis Klein* Date: 5/30/00  
(Signature)

Projected Completion Date for Preparation of Safety Evaluation/Authorization Basis Amendment Request: 5/31/00

### Description of Proposed Change

BNFL-TWP-SER-003, *Radiation Protection Program for Design, Revision 3*, is being revised to address WTP construction activities including the implementation of construction site radiological monitoring in accordance with 10 CFR 835.401 and the anticipated use of radioactive sealed sources and radiation generating devices by NRC or Agreement State licensed subcontractors.

### Reason for Proposed Change

A revision to the BNFL Inc. Radiation Protection Program (RPP) for Design is required because construction activities are outside the scope of the RPP for Design (Revision 3). As required by 10 CFR 835.101(g)(2), an update of the RPP shall be submitted to DOE prior to the initiation of a task not within the scope of the RPP.

### Affected Sections of Authorization Basis Documents

The only affected AB document is BNFL-TWP-SER-003, *Radiation Protection Program for Design, Revision 3*. The revised RPP is a complete revision. Content material focused on 10 CFR 835 Subpart K (Design and Control) remains in effect, although non-commitment detail has been relocated to implementing documents.

Changes in presentation order and the addition of new material focused on construction activities make presenting a markup of affected pages impractical. Revision bar/redline/strikeout techniques have not been used for the revision presented to DOE for review and approval.

Attachment: Markup of affected pages from Authorization Basis Documents, if practical.

<sup>1</sup> The Proposed ABCN Number shall be obtained from Project Document Control.



# Safety Evaluation

ISSUED BY  
RPP-WTP PDC  
00 5/31/00  
REV DATE

Page 1 of 3

Safety Evaluation Number<sup>1</sup>: SE-W375-00-00027 Revision No: 0

ABCN Number: ABCN-W375-00-00034

Safety Evaluation Subject: Radiation Protection Program for Design and Construction

## PART I: DESCRIPTION OF THE PROPOSED REVISION, BACKGROUND, AND SCHEDULE

1. Describe the proposed revision (including credible failure modes, if applicable).

BNFL-TWP-SER-003, *Radiation Protection Program for Design*, Revision 3, is being revised to address WTP construction activities including the implementation of construction site radiological monitoring in accordance with 10 CFR 835.401 and the anticipated use of radioactive sealed sources and radiation generating devices by NRC or Agreement State licensed subcontractors. In addition, content material focused on 10 CFR 835 Subpart K (Design and Control) remains in effect, although non-commitment detail has been relocated to implementing documents. The proposed changes are described in the attached matrix. These changes affect only the Radiation Protection Program and have no impact on credible failure modes.

2. Identify the affected Authorization Basis (AB) documents and perform a comparison and assessment of the revision against the AB.

The following potentially affected AB documents were reviewed to identify impacts resulting from the proposed revision:

BNFL-TWP-SER-003, Radiation Protection Program for Design, Revision 3  
BNFL-5193-ISP-01, Integrated Safety Management Plan, Revision 4  
BNFL-5193-SRD-01, Safety Requirements Document, Revision 2  
BNFL-5193-QAP-01, Quality Assurance Program and Implementation Plan, Revision 5  
BNFL-5193-ISAR-01, Initial Safety Analysis Report, Revision 0  
BNFL-5193-HAR-01, Revision 0

The only affected AB document is BNFL-TWP-SER-003, Rev. 3, *Radiation Protection Program for Design*. A comparison and assessment of the proposed revision has been prepared and is provided in the attached matrix.

3. List the references used for the safety evaluation.

10 CFR 835, Occupational Radiation Protection  
BNFL-TWP-SER-003, Radiation Protection Program for Design, Revision 3  
BNFL-5193-ISP-01, Integrated Safety Management Plan, Revision 4  
BNFL-5193-SRD-01, Safety Requirements Document, Revision 2  
BNFL-5193-QAP-01, Quality Assurance Program and Implementation Plan, Revision 5  
BNFL-5193-ISAR-01, Initial Safety Analysis Report, Revision 0  
BNFL-5193-HAR-01, Revision 0

<sup>1</sup> The Safety Evaluation Number shall be obtained from Project Document Control.



# Safety Evaluation

Safety Evaluation Number<sup>1</sup>: SE-W375-00-00027 Revision No: 0

ABCN Number: ABCN-W375-00-00034

Safety Evaluation Subject: Radiation Protection Program for Design and Construction

DOE G 441.1-1, Management and Administration of Radiation Protection Programs Guide

4. Describe the planned revision implementation schedule.

BNFL-TWP-SER-003, *Radiation Protection Program for Design and Construction*, Revision 4 is submitted for DOE review and approval May 31, 2000. The proposed revision must be approved and implemented prior to start of WTP construction activities.

## PART II: REGULATORY IMPACT OF PROPOSED AB REVISION

The following questions are to be answered as part of the safety evaluation, to determine if the proposed AB revision (and the proposed initiating change if applicable) requires prior RU approval.

- |  | YES                      | NO                                  |
|--|--------------------------|-------------------------------------|
| 1. Does the revision involve the deletion or modification of a standard previously identified or established in the approved SRD?  | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| JUSTIFICATION:   |                          |                                     |
| <b>The revised RPP was reviewed against Chapter 5 SRD requirements to verify that this revision does not modify or delete any SRD requirement.</b>   |                          |                                     |
| 2. Does the revision result in a reduction in commitment currently described in the AB?  | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| JUSTIFICATION:   |                          |                                     |
| <b>The proposed revision relocates some existing RPP descriptive material to the Radiological Control Program and other program implementing documents. This relocation does not delete any of the existing commitments in the RPP. See attached matrix for additional detail.</b> |                          |                                     |
| 3. Does the revision result in a reduction in the effectiveness of any program, procedure, or plan described in the AB.  | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| JUSTIFICATION:   |                          |                                     |
| <b>As described in the attached matrix, the proposed revision will not result in a reduction in effectiveness.</b>   |                          |                                     |

Note: Guidance on defining the terms and responding to the above questions is provided in K70C528, Code of Practice for Managing Changes to the Authorization Basis, Appendix 6.

If all the answers to the above questions are no, then the change can be made without prior RU approval.

If any of the above answers is yes, then RU approval is required prior to implementation of the AB revision (and the initiating change if applicable). An ABAR shall be prepared to obtain RU approval (see K70C528, Appendix 7.)



### Explanatory Note

K70CS28D\_1 contains a situation that requires discussion in order to address rigorous procedure compliance with respect to BNFL-TWP-SER-003, *Radiation Protection Program for Design and Construction*, Revision 4.

In completing the Safety Evaluation, the Evaluator/Originator must acknowledge that two types of changes are being incorporated into Revision 4 of the RPP-WTP Project RPP. These are:

- In general, Authorization Basis documents should focus on those commitments that are required for compliance with regulations and other project requirements. Descriptive material focused on how compliance is achieved is best presented in implementing program documents, procedures and codes of practice, as appropriate.

Therefore, descriptive material related to how the RPP-WTP achieves compliance with 10 CFR 835 requirements has been relocated from the RPP to PL-W375-NS00004, *Radiological Control Program*, Revision 0, implementing procedures and codes of practice.

- The construction scope is not provided for in Revision 3 of the RPP. In accordance with 10 CFR 835.101(g)(2) a revision to the RPP is required to address the construction scope. These changes must be approved by the DOE prior to implementation.

Completing the Safety Evaluation in relation to bullet one changes, results in the questions in Part II being answered "no." The justification (no deletion or modification of standards in the SRD, no reduction in commitment, no reduction in effectiveness of any program, procedure or plan described in the AB) is provided in the attachment to the Safety Evaluation.

Regardless of the "no" responses, the changes in RPP Revision 4 require DOE approval because of the change in RPP scope. Refer to Authorization Basis Amendment Request ABAR-W375-00-00022, Revision 0.



D. J. Pisarcik  
SE-W375-00-00027 Evaluator/Originator

**Evaluation of Radiation Protection Program (RPP) Revision 4 Changes Against  
Current Commitments and Program Effectiveness**

**Background**

Revision 4 to the River Protection Project – Waste Treatment Plant (RPP-WTP) Radiation Protection Program (RPP) for Design and Construction was processed in accordance with K70CS28, *Code of Practice for Managing Changes to Control the Authorization Basis*. The review and approval process for Revision 4 of the RPP was based on Authorization Basis Amendment Request (ABAR) number ABAR-W375-00-00022.

Planning for Revision 4 of the RPP began in the fall 1999. Discussions were held with Construction Management to define those construction activities that could trigger 10 CFR 835 requirements. The activities identified were primarily radiography to examine structures during construction, the use of densitometers containing sealed sources, and the functional testing of instruments such as gamma monitors prior to startup. Since Revision 3 of the RPP includes triggers for regulatory requirements that will become applicable in the future (Appendix A), these triggers were evaluated in relation to construction activities to identify specific elements that may require action in Revision 4 of the RPP. In addition, discussions were held with DynCorp Hanford and Waste Management Hanford to identify radiological monitoring activities currently in effect for the construction site.

During working level meetings with the RU, BNFL Inc. described the intended approach to the construction RPP scope and on January 31, 2000, BNFL Inc. transmitted a letter to the RU describing the RPP for construction. The purpose of this letter was to document the results of the working level RU meetings and gain RU concurrence for the intended approach. On March 1, 2000, BNFL Inc. received a letter from the RU indicating that the RPP approach should be acceptable. The RPP was then drafted in concert with the Radiological Control Program (RCP) manual which implements the RPP. In preparing the RPP, material that was descriptive (should, will and may statements) was relocated to the RCP. The draft RPP and RCP were provided to the RU in working level meetings to ensure continued alignment.

**Purpose**

This document evaluates the changes to Revision 4 of the BNFL Inc. RPP for Design and Construction to ensure that the changes "...do not decrease the effectiveness of the RPP and the RPP, as changed, continues to meet the requirements of this part." (10 CFR 835.101(b)). The assessment of "effectiveness" is performed in accordance with K70CS28D, Rev. 1, *Code of Practice for Managing Changes to Control the Authorization Basis*, Appendix 5, Section 2.0.

**Content**

The evaluation of continued compliance and effectiveness is presented in the following table.

Change	Compliance Evaluation	Effectiveness Evaluation
<p>Sections 1, Introduction 2, RPP Document Organization 3, Purpose and 4, Applicability were modified to address the addition of construction phase scope. Additions included describing activities to be added during construction and introducing the Radiological Control Program document</p> <p>The following text was moved from RPP Section 5.1, ALARA Policy/Management Commitment, to Chapter 11, Design and Control, of the Radiological Control Program:</p> <p>To meet this policy, BNFL Inc. will do the following:</p> <ul style="list-style-type: none"> <li>• Ensure that reviews of regulatory requirements are performed to maintain "State of the Art" Occupational Radiation Protection in all activities</li> <li>• Ensure that employees performing radiological work activities are trained</li> <li>• Ensure that personnel responsible for developing and implementing measures necessary for ensuring compliance with the requirements of 10 CFR 835 shall have the appropriate education, training and skills to discharge these responsibilities</li> <li>• Establish and maintain line management accountability for radiation protection performance</li> <li>• Ensure measurements, analyses, and worker monitoring results are accurately and appropriately made and records maintained</li> <li>• Perform radiological operations in a manner which controls the spread of radioactive materials and reduces employee exposure, seeking to make exposure levels ALARA</li> <li>• Incorporate dose/contamination/waste reduction and minimization features into new facility designs</li> <li>• Perform oversight of radiological operations to ensure that client requirements are being met and appropriate radiological work practices are being implemented.</li> </ul>	<p>Material in these sections was added for the purpose of establishing compliance with 10 CFR 835, Occupational Radiation Protection, during construction.</p> <p>The subject text amplifies the commitment made in the revised RPP Section 5.1, BNFL Policy For Radiological Control and ALARA; however, it does not contain any additional commitments specific to 10 CFR 835 requirements.</p> <p>It does, however, describe an acceptable approach for implementing the ALARA policy and has therefore been retained in RCP. This change will not affect compliance. The requirement to ensure personnel responsible for 10 CFR 835 compliance possess the appropriate education, training and skills is addressed in RPP Revision 4, Section 5.3.6.</p>	<p>BNFL Inc. believes that the changes will result in an effective program for 10 CFR 835 compliance.</p> <p>The subject text simply describes how the BNFL Inc. ALARA Policy commitment will be met. Relocation of the subject text to the RCP does not change the ALARA policy or remove any commitment from the RPP; consequently, this change does not reduce the effectiveness of the RPP.</p>

Change	Compliance Evaluation	Effectiveness Evaluation
<p>The following text from RPP Section 5.5.8.1, Process Description, was moved to RCP Chapter 11, Design and Control:</p> <p>Use of the approved CBA methodology will ensure that quantitative methods are applied to the ALARA process, thereby ensuring that the ALARA process leads to consistent, rational, defensible, coherent decisions as to which dose-reduction and cost-minimization/optimization efforts are reasonable.</p> <p>The overall role of CBA in this process is summarized as follows:</p> <ul style="list-style-type: none"> <li>• If an option is justified on the basis of CBA, then it should be implemented.</li> <li>• If an option is not cost effective on CBA grounds, then it is necessary to consider whether any of the other factors identified in the ALARA design process make implementation appropriate, either when considered in isolation or as factors supporting a marginal ALARA case.</li> </ul> <p>Previous experience may indicate that the magnitude of the collective dose does not justify any dose reduction actions based on CBA.</p> <p>The following general principles are consistent with BNFL Inc. implementing documents for CBA:</p> <ul style="list-style-type: none"> <li>• The quantified collective dose valuation should not be viewed as a precise indicator of whether a particular option is chosen or not. Instead it provides a guide as to whether the option is reasonable in the circumstances and allows comparison with similarly evaluated options.</li> <li>• Unless precision in a CBA calculation should be avoided as it tends to imply a greater meaning than is appropriate. Additionally, all options being evaluated should utilize a similar level of precision.</li> <li>• It is the dose that would be averted by an option that is the input to the assessment. The optimum CBA solution is determined where the cost of the next increment in protection would exceed the incremental present-annuity detriment valuation: this is known technically as a "differential" CBA.</li> <li>• All doses and total life-cycle financial costs affected by the option under consideration should be considered, in principle, in some cases this will include doses and costs from construction, commissioning, operation, maintenance, modifications, decommissioning, and waste management.</li> <li>• Future financial costs can be discounted to Net Present Value - a typical discount rate to be applied to plant lifetime costs is 5% per year. If even longer-term costs are likely to be significant (e.g., late decommissioning stages), further advice should be sought from appropriate BNFL Inc. financial and accounting organizations. In many cases, cost discounting will be a second-order effect and can be omitted.</li> <li>• It is important to use realistic best estimate dose data for CBA assessments. In particular, note that prospective dose data from safety analyses and design assessments often are conservative estimates and should be used with care.</li> </ul>	<p>The subject text summarizes the BNFL approach to optimization using Cost Benefit Analysis (CBA) techniques. It does not contain any commitments related to specific 10 CFR 835 requirements. The use of optimization methods during the design of the WTP remains a BNFL commitment as stated in RPP Section 5.1.1.1.</p>	<p>The subject text does not address commitments related to 10 CFR 835 requirements and simply describes how the CBA methodology is applied. Consequently, its relocation to the RCP does not diminish BNFL's commitment to use optimization methods during WTP design activities. This change will not decrease the effectiveness of the RPP.</p>

Change	Compliance Evaluation	Effectiveness Evaluation
<p>The following text was moved from RPP Section 5.5.9.2, Hierarchy of Protection, to RCP Chapter 11, Design and Control:</p> <p>In all instances, consideration should be given to the removal or minimization of hazards by the use of alternative agents or processes. Consideration of exposure during the hazard analysis stage of process definition will contribute to the reduction of exposure.</p> <p>These may, in some cases, physically separate the employee from the hazard and are employed to reduce the magnitude and/or likelihood of radiological exposure. Engineered safety features may be deterministic (ensuring by their design that safety limits are not exceeded) and/or probabilistic (low failure probability presenting low risk). Examples of engineered safety features are as follows:</p> <ul style="list-style-type: none"> <li>- Shielding</li> <li>- Ventilation</li> <li>- Containment</li> <li>- Remote handling</li> <li>- Fixed barriers</li> <li>- Interlocks</li> <li>- Passive fail-safe features</li> <li>- Active fail-safe features</li> <li>- Zone segregation</li> <li>- Access control and delineation.</li> </ul> <p>These are operational management controls applied to reduce exposure to the hazard in both routine operation and maintenance. These controls concentrate on methods and conduct of work and generally are not as reliable as engineered safety features. Examples are as follows:</p> <ul style="list-style-type: none"> <li>- Installed radiological monitoring devices</li> <li>- Portable radiological monitoring devices</li> <li>- Pre-planning and coordination of work tasks</li> <li>- Temporary barriers, labels, and notices</li> <li>- Training and qualification program</li> <li>- Procedures.</li> </ul> <p>Use of PPE is appropriate where it is judged beneficial to reinforce the protection afforded by other measures, personnel enter areas not intended for routine occupancy, or where the provisions available provide insufficient protection. PPE is generally considered to be the least desirable and least reliable method of applied protection.</p>	<p>The subject text amplifies the RPP commitment to use a hierarchy of protection as described in RPP Section 5.11.2.2, <i>Hierarchy of Protection</i>. This requirement implements the 10 CFR 835 requirement to use physical design features as the primary method to ensure exposures remain ALARA. Since the relocation of this amplifying text does not change the commitment made in the RPP, compliance to 10 CFR 835 is not affected.</p>	<p>The subject text does not contain any commitments related to 10 CFR 835 requirements. Since the text simply expands on the RPP commitment to use a hierarchy of protection, its relocation to the RCP will not decrease the effectiveness of the RPP.</p>

Change	Compliance Evaluation	Effectiveness Evaluation
<p>The following text was moved from RPP Section 5.5.10, ALARA Design Criteria, to RCP Chapter 11, Design and Control:</p> <p>The ALARA design criteria shall be applied throughout the design of the facility:</p> <p>5.5.10.1. The primary methods used to minimize radiation exposure in controlled areas shall be physical design features (e.g., confinement, ventilation, remote handling, and shielding).</p> <p>5.5.10.2. Administrative controls shall be employed only as supplemental methods to control radiation exposure.</p> <p>5.5.10.3. For specific activities where use of physical design features is demonstrated to be impractical, administrative controls shall be used to maintain radiation exposure ALARA.</p> <p>5.5.10.4. Optimization methods (i.e., cost benefit analysis) will be used to assure that occupational exposure is maintained ALARA in developing and justifying facility design and physical controls. It is not expected that formal collective dose cost benefit analyses would be used, or documented in all ALARA decisions. The formality and degree of quantitative analysis should reflect the scale and type of problem under consideration.</p> <p>5.5.10.5. Regarding the control of airborne radioactive materials, the design objective shall be, under normal conditions, to avoid releases to the workplace atmosphere.</p> <p>5.5.10.6. In any situation, confinement and ventilation shall normally be used to control the inhalation of airborne radioactive material by workers to levels that are ALARA.</p> <p>5.5.10.7. The design or modification of a facility and the selection of materials shall include features that facilitate operations, maintenance, decontamination, and decommissioning.</p> <p>5.5.10.8. During routine operations, the combination of physical design features and administrative controls shall provide that the anticipated occupational dose to general employees shall not exceed the limits established in § 835.202, and the ALARA process is utilized for personnel exposures to ionizing radiation.</p> <p>5.5.10.9. The design objective for controlling personnel exposure from external sources of radiation in areas of continuous occupancy (2,000 hours per year) shall be to maintain exposure levels below an average of 0.5 mrem per hour and as far below this average as is reasonably achievable.</p> <p>5.5.10.10 The design objectives for exposure rates for potential exposure to a radiological worker whose occupancy differs from the above (e.g., less than 2,000 hours per year) shall be ALARA, and shall not exceed 20 percent of the applicable standards in Sec. 835.202, which are:</p> <ul style="list-style-type: none"> <li>• A total effective dose equivalent of 5 rems;</li> <li>• The sum of the deep dose equivalent for external exposure and the committed dose equivalent to any organ or tissue other than the lens of the eye of 50 rems;</li> <li>• A lens of the eye dose equivalent of 15 rems; and</li> <li>• A shallow dose equivalent of 50 rems to the skin or to any extremity.</li> </ul>	<p>The subject text amplifies the RPP commitment to apply ALARA design criteria, consistent with 10 CFR 835 requirements, throughout the design of the facility.</p> <p>The text is taken verbatim from the regulation, and is duplicated by the commitment in RPP Rev 4, Section 5.11 that "ALARA design criteria consistent with 10 CFR 835 requirements shall be developed and applied throughout the design and construction of the facility."</p> <p>Relocation to the RCP does not diminish the commitment made in the RPP.</p>	<p>The RPP commitment to apply the ALARA design criteria of 10 CFR 835 remains unchanged. Since the subject text simply restates the regulatory requirements, which are committed to in RPP Section 5.11, its relocation to the RCP will not decrease the effectiveness of the RPP.</p>

Change	Compliance Evaluation	Effectiveness Evaluation
<p>The following text from RPP Section 5.5.11.1, Baseline Design Proposal, was moved to RCP Chapter 11, Design and Control:</p> <p>For the RPP-WTP Project, a baseline design proposal is a proposed facility, or portion of the facility, that meets the criteria outlined in Section 5.5.10, ALARA Design Criteria.</p> <p>The following text from RPP Section 5.5.11.2, Identification of Alternatives, was moved to RCP Chapter 11, Design and Control:</p> <p>For each radiation exposure scenario evaluated during the ALARA process, alternatives are generated for later evaluation. The evaluations should not be initiated until all reasonable alternatives have been identified and documented. This evaluation ensures the alternatives are considered systematically and consistently.</p> <p>Each alternative that provides less exposure (e.g., decreased source term and/or exposure time) and a lower exposure rate to personnel should be identified and evaluated. Candidates include the following:</p> <ul style="list-style-type: none"> <li>• Substitution or minimization of source terms affecting personnel dose</li> <li>• Increased reliability of processes and equipment</li> <li>• Increasing distance and shielding to the source term</li> <li>• Increasing effectiveness of engineered controls</li> <li>• Decreasing the need for exposure</li> <li>• Decreasing exposure time</li> <li>• Modification of the facility layout or process flow.</li> </ul>	<p>The subject text does not address any specific 10 CFR 835 requirement.</p> <p>The subject text does not address any specific 10 CFR 835 requirement, but rather describes implementation of the ALARA process activities. Since the regulatory commitment to apply the ALARA process throughout the design of the WTP remains unchanged by this action, no impact to compliance will result.</p>	<p>As the subject text simply defines a baseline design proposal and does not contain a commitment applicable to regulatory or safety standard requirements, its relocation to the RCP will not decrease the effectiveness of the RPP.</p> <p>The subject text does not contain any commitments to specific 10 CFR 835 requirements and simply expands on the RPP Section 5.11.2.3 commitment to identify and evaluate alternatives impacting personnel dose. Consequently, its relocation to the RCP will not decrease the effectiveness of the RPP.</p>

Change	Compliance Evaluation	Effectiveness Evaluation
<p>The following text from Section 5.11.3, ALARA Design Assessments, was moved to RCP Chapter 11, Design and Control:</p> <p>ALARA design assessments are conducted and documented for each part of the design. The following phases or components of the design should be assessed by the designer, either individually or in combination, with involvement by a radiological engineer, as appropriate:</p> <ul style="list-style-type: none"> <li>• Process</li> <li>• Operation and maintenance philosophy</li> <li>• Plant layout (to include adequate provisions for access and egress to controlled areas, and adequacy of plant monitoring)</li> <li>• Cell layout</li> <li>• Source minimization</li> <li>• Contamination control</li> <li>• Individual shield items (e.g., glovebox shielding, shield doors, shield windows) built shielding (walls, ceilings, and floors)</li> <li>• Containment/ventilation</li> <li>• Design aspects of operations</li> <li>• Design aspects of decommissioning.</li> </ul> <p>An ALARA assessment during site selection normally is conducted. However, for the RPP-WTP Project, the site has been pre-selected by the DOE. The site selection ALARA assessment will, therefore, not be conducted.</p> <p>An estimate of the dose that will result from each design alternative and the associated cost are needed for the ALARA assessment. The best available estimate should be used, as large conservatisms could obscure the potential dose savings. Cost ranges should be included. Where applicable, cost uncertainties should be documented as part of the evaluation. Designers must record all assumptions used in the evaluations.</p> <p>More than one alternative applied to an exposure situation may provide equivalent ALARA benefit. In these cases, operational experience of existing plants should be taken into account wherever it is reasonable to do so. Application of this experience may contribute to the estimation of dose, and also may indicate areas where dose reduction consistent with ALARA has been achieved previously.</p> <p>In addition, designers should recognize that opportunities to apply the ALARA process occur during daily design activities. These actions must be documented and provided to the ASC for overall evaluation. In the general case, the following factors should be considered in ALARA assessments:</p> <ul style="list-style-type: none"> <li>• Any design modification to reduce dose might result in an increase of a conventional hazard (e.g., risk of injury from collision with equipment).</li> <li>• Any design modification might result in greater design, construction, operating, or</li> </ul>	<p>The subject text does not contain a commitment regarding any specific regulatory requirement. Since the text only describes how to perform ALARA design assessments, its relocation to the RCP will not result in any change to the process or affect compliance.</p>	<p>The subject text does not contain a commitment regarding any specific regulatory requirement. The RPP Section 5.11.2.3 commitment to perform ALARA assessments as part of the design process remains unchanged. Consequently, the relocation of the subject text to the RCP will not decrease the effectiveness of the RPP.</p>

Change	Compliance Evaluation	Effectiveness Evaluation
<p>documentation costs.</p> <ul style="list-style-type: none"> <li>Any design modification might lead to difficulties in building, operating, or decommissioning the plant.</li> </ul> <p>The creation of an additional hazard does not necessarily eliminate selection of an alternative under consideration. Risk from the resulting hazard could be mitigated to the point of no consequence. The advice of other safety disciplines should be sought in such cases. Whenever the risk from competing safety alternatives exists, the final decision should be based on minimizing the overall risk.</p> <p>The following text from RPP Section 5.5.11.4, ALARA Design Reviews, was moved to RCP Chapter 11, Design and Control:</p> <p>At key stages of the design, as determined by the ASC, formal reviews will be held to examine the design critically for improvements required to demonstrate ALARA compliance and to record key ALARA decisions (many of which will have been recorded in the documentation associated with the ALARA assessments). Recognizing that many minor ALARA decisions are made implicitly and documented by the design engineers during the course of the design, the ALARA reviews also can be used to record where dose reduction has been achieved by the use of "good engineering practices" (e.g., where a design modification has been made to achieve an improved standard of engineering, which will result in a notable dose saving).</p> <p>These reviews should use appropriate checklists to ensure consistency. Reviews shall be conducted by personnel not involved directly in producing the design. The outcome of the reviews will record the key ALARA decisions made in each design stage.</p>	<p>The subject text does not address any specific 10 CFR 835 requirements; consequently, its relocation to the RCP will not affect compliance.</p>	<p>The RPP Section 5.11.2.3 commitment to perform formal ALARA reviews as part of the design process remains unchanged. Since the subject text does not contain any commitments applicable to specific regulatory requirements or process safety standards, its relocation to the RCP will not decrease the effectiveness of the RPP.</p>

Change	Compliance Evaluation	Effectiveness Evaluation
<p>The following text from RPP Section 5.5.11.5, Consensus Approval, was moved to RCP Chapter 11, Design and Control:</p> <p>It is anticipated that more than one alternative may be proposed which achieves the ALARA objective. When assessments on each alternative are completed, the ASC will select the optimum alternative. Subcommittee approval will constitute agreement of the majority of committee members. The ASC, through the PSC, will provide its recommendation(s) to the Project Manager for consideration and approval. If agreement is reached, the concepts are incorporated into the facility design. Contested issues should be clearly identified, characterized, and negotiated between the ASC and the Project Manager to a final resolution. If this cannot be achieved, the RPP-WTP General Manager will make the final decision.</p> <p>The following text from RPP Section 5.5.11.6, Incorporate Changes into Design, was moved to RCP Chapter 11, Design and Control:</p> <p>Following a decision to incorporate the ALARA changes into the design; the changes will be implemented using authorized design change control procedures.</p>	<p>The subject text does not address any specific 10 CFR 835 requirements; consequently, its relocation to the RCP will not affect compliance.</p>	<p>The RPP Section 5.11.2.3 commitment to describe the ALARA decision process in appropriate project documents remains unchanged. Since the subject text simply describes how such decisions are made, its relocation to the RCP will not decrease the effectiveness of the RPP.</p>
<p>The following text from RPP Section 5.5.12, ALARA Documentation, was moved to RPP Section 5.8, Records:</p> <p>All records pertaining to the ALARA design review process including formal ALARA design reviews, cost/benefit reviews, design process audits, and assessments that include ALARA shall be retained in accordance with BNFL Inc. records retention procedures.</p>	<p>The subject text does not address any specific 10 CFR 835 requirements; consequently, its relocation to the RCP will not affect compliance.</p>	<p>The RPP Section 5.11.2.3 commitment to document how changes are incorporated into the design remains unchanged. Since the subject text simply refers to the only process by which such changes are made, its relocation to the RCP will not decrease the effectiveness of the RPP.</p> <p>No impact.</p>
<p>The following text from RPP Section 5.5.12, ALARA Documentation, was moved to RPP Section 5.8, Records:</p> <p>All records pertaining to the ALARA design review process including formal ALARA design reviews, cost/benefit reviews, design process audits, and assessments that include ALARA shall be retained in accordance with BNFL Inc. records retention procedures.</p>	<p>No change to commitment. RPP Rev. 4, Section 5.8 continues to provide compliance to 10 CFR 835 records requirements in Subpart H, as applicable, to project phase.</p>	<p>No impact.</p>

Change	Compliance Evaluation	Effectiveness Evaluation
<p>The following text from RPP Section 5.5.9.1, Overview, was moved to RCP Chapter 11, Design and Control.</p> <p>The following are general guidelines for consideration in the ALARA design process.</p> <ul style="list-style-type: none"> <li>All parts of the design will be shown to result in a dose that will be ALARA. The ALARA principle is applied to both collective dose and to individual doses as well as to general area dose rates.</li> <li>The mechanisms for achieving and demonstrating ALARA will be appropriate to the particular design stage, and the amount of effort to produce the demonstration will be consistent with the magnitude of the estimated dose. Iteration of the dose estimate as the design progresses may lead to a change in the effort put into the ALARA demonstration.</li> </ul> <p>Sections 5.4 through 5.10, and 5.12 through 5.16 were added to incorporate 10 CFR 835 requirements that become applicable during construction.</p>	<p>The subject text does not address any specific 10 CFR 835 requirement. RPP Section 5.11.2.1 retains the commitment to apply the ALARA design process to all stages of WTP design as required by the Rule.</p>	<p>The subject text simply describes how the ALARA process works and the expected end results. Since relocation of the subject text does not alter the RPP commitment to apply the ALARA process to design activities, its relocation to the RCP does not decrease the effectiveness of the RPP.</p>
<p>Sections 5.4 through 5.10, and 5.12 through 5.16 were added to incorporate 10 CFR 835 requirements that become applicable during construction.</p>	<p>Material in these sections was added for the purpose of establishing compliance with 10 CFR 835, <i>Occupational Radiation Protection</i>, during construction.</p>	<p>BNFL, Inc. believes that the changes will result in an effective program for 10 CFR 835 compliance.</p>



## Authorization Basis Amendment Request

Page 1 of 2

ISSUED BY  
RPP-WTP POC  
06/25/00  
INIT DATE

ABAR Title: Radiation Protection Program for Design and Construction

ABAR #: ABAR-W375-00-00022 Revision: 0 Associated ABCN #: ABCN-W375-00-00034

Originator: GA Simiele Date: 5/24/00  
Print Name

Description of proposed revision:

BNFL-TWP-SER-003, *Radiation Protection Program for Design*, Revision 3, is being revised to address WTP construction activities including the implementation of construction site radiological monitoring in accordance with 10 CFR 835.401 and the anticipated use of radioactive sealed sources and radiation generating devices by NRC or Agreement State licensed subcontractors.

Reason(s) for the proposed revision:

A revision to the BNFL Inc. Radiation Protection Program (RPP) for Design is required because construction activities are outside the scope of the current RPP. As required by 10 CFR 835.101(g)(2), an update of the RPP shall be submitted to DOE prior to the initiation of a task not within the scope of the RPP.

Description of the proposed implementation schedule:

Following RU approval, the proposed revision must be implemented prior to start of WTP construction activities.

If the revision involves the deletion or modification of a standard previously identified in the approved SRD, provide:

- A. An evaluation that demonstrates the revised SRD continues to identify a set of standards that will provide adequate safety, comply with all applicable laws and regulations, and conform to top-level safety standards; and
- B. A certification that the revised SRD identifies a set of standards that continues to provide adequate safety, comply with all applicable laws and regulations, and conform to top-level safety standards.

Attachments:

1. Copies of the AB document(s) or appropriate excerpt showing the proposed revision(s).
2. Copy of safety evaluation.
3. If not included above, justification for the revision and demonstration that the revision is safe.
4. Items A and B above, if applicable.



Authorization Basis Amendment Request

ABAR Title: Radiation Protection Program for Design and Construction

ABAR #: ABAR-W375-00-00022 Revision: 0 Associated ABCN #: ABCN-W375-00-00034

Originator: GA Simiele Date: 5/24/00  
Print Name

[Signature]  
\_\_\_\_\_  
Manager, Engineering

May 30, 2000  
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Date

[Signature]  
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Radiological, Nuclear, and Process Safety Manager

5/30/00  
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Date

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Manager, Quality Assurance

30 May 2000  
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Date

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Chairman, Project Safety Committee

30 May 2000  
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Date

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RFP-WTF General Manager

5/31/00  
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Date